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BEACH PROTECTION CREATES LEGAL PROBLEMS

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HYDRAULICS DIVISION

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BEACH PROTECTION CREATES LEGAL PROBLEMS

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City engineers in a resort and seashore city such as Miami Beach are presented with many uncommon problems. Often the technical aspects of engineering must be coordinated with economic and legal requirements. This has been particularly true in the City's efforts to control beach erosion.

As the City has grown and prospered, portions of our beach area have been developed into public parks. Other portions have been developed and controlled by private interests. Hence, beach erosion has for some years been a private as well as a public problem.

In its infancy, the City was faced by the simple realization that beach erosion would have to be counteracted by protective measures. Little was done, however, until the City was ravaged by the highly destructive 1926 hurricane. The initial municipal beach protection program was begun almost immediately thereafter.

By the end of 1927, protective measures were completed between 22nd and 31st Streets. In 1930 the system was extended north to 44th Street. The accompanying drawings indicate these areas. Ocean front hotel construction was now possible in these areas. At this point, the problem of beach erosion was not only the protection of the upland property, but also the reclamation of a wide beach area to accommodate large numbers of people.

After 1935 private individuals constructed protective works at random locations from 22nd Street south to 15th Street, which is near the northern boundary line of the City's largest public beach—Lummus Park.

In the late Thirties, ocean front hotel construction took on a boomlike aspect. Hotel owners soon discovered that the luxury of swimming pools was a special attraction to their guests. As time passed, increasing numbers used the facilities of the pools rather than the natural sands of the ocean front.

During the war, many of the hotels were leased to the Government. They were returned to their owners at the end of hostilities and the City began to gear itself for the post-war influx of tourists.

Many owners, who had built their structures prior to the innovation of swimming pools, felt that they could not compete with the newer hotels unless they also built pools and cabanas.

In practically every instance insufficient room to the rear of the bulkheads was available for such expansion. To provide this needed space, owners of the properties from Lummus Park to 44th Street petitioned the City Council for an ordinance to move the bulkhead lines 75 feet seaward.

Separate ordinances were adopted for three different areas. Each ordinance designated the seaward limits of the bulkheads and the outer limits of the groins and prohibited the removal of sand from the ocean for backfill purposes.

Where protective works had been previously constructed, the new bulkhead line lay between the Mean High and the Mean Low water lines. However, in

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certain instances, it was landward of the Mean High water line. The main engineering question was whether a new foreshore could be developed—the answer was yes.

It was originally planned that the owners in certain sections would pool their funds and the City would handle the construction. Because of many divergent interests, including those pertaining to fee owners and lease holders, this proved impracticable and several of the owners proceeded with their own particular phases of the work.

One problem involved the treatment of street ends. In order to avoid expense to the City, the property owners were required to construct return walls from the new bulkhead to the old one. In addition, the new groins were to be constructed in front of private property rather than within the street ends.

In 1949, a suit was filed making the City and one private owner, who had constructed to the new bulkhead line, defendants. The plaintiffs contended that the harbor line established by the City encroached upon the foreshore of the ocean. They asserted that the foreshore was to be held in trust by the State for the use and benefit of the public, primarily for such purposes as navigation, commerce, fishing and bathing, and that the general public has the right to use the surface of the foreshore and to have access to the waters.

The bill of complaint did not request an immediate injunction, so the City continued to grant permits for the construction of protective works. However, a later petition to the Circuit Court resulted in a temporary injunction, pending final hearing and decree in the case. The City was restrained from granting permits for construction of seawalls, bulkheads, fill or other structures on or across the foreshore of the ocean. The foreshore was defined as being that area lying east of the ordinary High Water mark of the ocean. The court further decreed that an exception to the injunction was that it would not extend or apply to the construction of groins or jetties.

The injunction applied not only to the areas covered by the ordinance under question, but to the entire City.

It resulted in one interesting problem. In this instance the City granted a permit for the construction of a bulkhead immediately shoreward of the then existing Mean High Water line. Work was not commenced for several months, at which time it was discovered that the shoreline had receded. The property owner went to court for a clarification, and it was decreed that he could construct a bulkhead on the line for which the permit was originally granted despite the fact that erosion had occurred.

During the latter part of 1952, the defendants were separated, and the hearing was set for the case involving the City only.

The attorney for the City presented to the engineers the legal principles involved. These included:

1. That in the event of an avulsion, the upland owner was entitled to re-claim lost land.
2. That an avulsion is a sudden and perceptible kind of erosion.
3. That ordinary High Water line and Mean High Water line are synonymous.
4. That the foreshore is the area between Mean High Water line and Mean Low Water line.

The City in its defense first presented a discussion of the general principles of beach erosion on the East Coast of Florida. It covered the following: Origin of Sand; Phenomena of Accretion; Phenomena of Erosion; and Function and Effect of Bulkheads and Groins.

The sand constituting the beaches of the East Coast of Florida generally consist of a mixture of silica and shell. The silica sand which originated in the Piedmont and Appalachian mountain regions of the southeastern states was carried to the ocean by several rivers, among them the Savannah. Southerly currents induced by the relatively intense northerly winds transported this sand to the south. The shell originated in the offshore areas along the coastal front.

The general natural tendency along the ocean front is accretion. However, local erosion problems arose as a result of human interference with the natural regimen of the sand movement.

Many of these problems have resulted from construction of inlets and jetties, which interrupted the flow of sand to the south. At these places, the tendency is for accretion on the north side of a jetty and for erosion on the south side. This same phenomenon occurs at the ends of a system of protective works, when groins are included.

The City contended that this type of erosion resulting from the littoral currents was of an avulsive nature. During periods of northerly winds, which are relatively infrequent as compared with southerly winds, but are of greater intensity, erosion is readily observed at many times. On many occasions the retreat of the shoreline has been so sudden that the protection of upland properties with sand bags has been necessary.

Erosion resulting from hurricane storms is definitely of an avulsive nature with the waves attacking the foreshore and uplands and generally casting the sand inland. After every storm of hurricane intensity, sand is piled on ocean front parks and bordering streets.

Accretion along the Florida coastline occurs in a fluctuating manner resulting from the influx of new sand and attacks by storms.

Photographs were taken on a relatively calm day along a portion of the foreshore over a period of a half tidal cycle.

These photographs demonstrated that the foreshore was wet most of the time, and that the breaking waves roll up beyond the Mean High Water line. They were introduced primarily to show that the line of Mean High water was at a lower elevation than is ordinarily believed.

Two sketches were submitted. One showed the width of the foreshore after the 1926 hurricane and prior to construction of beach protective works. The other showed the width of foreshore after the protective works had fully developed the beach. They proved that the protective works resulted in a wider foreshore, the resultant average width being thirty-six feet as compared with twenty-two feet.

The book, "Hurricanes, Their Nature and History" by Ivan Ray Tannehill, was used as a reference to determine what storms might possibly have affected the Miami Beach shoreline prior to 1926. It is believed that the period from 1837 to 1876 was one of accretion, from 1876 to 1916 one of recession, or at least, very little advance, and from 1916 to 1926 one of accretion.

The original government survey of 1874 was used to reproduce a traverse line called the "sea beach" line. Present day section corners were assumed to be in the same locations as the original. There were obvious errors in the original survey. In the government survey, the sea beach line fell a substantial distance seaward from the new bulkhead line except for a very short distance near 15th Street.

Research enabled the reproduction of a Spring time 1917 Mean High water line. Surveys had been made on streets running to the ocean for the purpose of paving. Elevations were taken to the water edge and the line of Mean High

water could be readily interpolated. The 1917 Mean High water line throughout its entire length lay between the original and present bulkhead lines and were generally closer to the latter.

In 1926 a survey was made prior to the big hurricane but only over the southern section of the area under litigation.

In 1927 surveys were made of the entire ocean front within the city limits for the purpose of developing a comprehensive beach protection plan.

The Mean High water lines of 1917, 1926 and 1927 were presented on one exhibit. The 1927 line was shoreward of the other two primarily as a result of the 1926 avulsion. The 1926 line in places coincided with the present day (1952) bulkhead line. It lay seaward of the 1917 line. It is believed, that where data are lacking for the 1926 line, it would have been located seaward of the one that existed in 1917.

One important factor in an analysis of this kind, where the data are limited, is that if frequent observations had been made the maximum seaward advance of the Mean High Water line would in all probability, have been found to be greater than revealed by the surveys of 1917 and 1926. It would have been a rare coincidence had the maximum advance occurred at a time when surveys had been made for other purposes.

Surveys made after the completion of the protective works showed the normal fluctuations that occur in the shore line between groins. Naturally they are much less than with a non-protected coast line.

The original record plats of the subdivisions were placed in the record. One of the subdivisions had been platted in 1915. It showed an undesignated shore line along the eastern boundary. The worded description called this line the Mean Low Water line. Since this line lay in parts shoreward of the original bulkhead line and generally contradicted the 1917 line, we believed it was inaccurate. Testimony by the surveyor revealed that there was no relationship between it and the actual Mean Low Water line of that date. It was actually only the sea weed line as he found it at that time. Since the Mean Tidal Range is only two and one-half feet, sea weed because of wave action will be generally found above the line of Mean High water.

The area south of 22nd Street required special analysis primarily because some property had not yet been protected with bulkheads and groins. After the works had been completed north of this location in 1927, erosion commenced in this area. This erosion continued in the unprotected portions in a spasmodic and avulsive manner.

It was shown also that here in certain places the 1926 Mean High Water line practically coincided with the new bulkhead line.

Exhibits in the nature of sketches and photographs were submitted to show the effects of the new bulkhead lines. They demonstrated that where groins had been properly constructed in connection with the new bulkheads a foreshore could be developed.

An exhibit called a "composite survey" herewith attached, was submitted. A single line drawn through the maximum seaward locations of the various Mean High Water lines from 1917 to 1947 was shown in relation to the original and new bulkhead lines. Generally this composite line coincides with the new bulkhead line.

The final ruling of the Court was as follows:

"That the defendant city of Miami Beach, its councilmen, agents, employees and attorneys be and they and each of them are enjoined and restrained from granting to any upland or riparian owner of property along the Atlantic Ocean or to any other person, a permit or authority to

construct a sea wall, bulkhead, fill or other structure, on or across the foreshore of the Atlantic Ocean as the same exists and is located today and as the same shall exist and be located from day to day, being that area lying east of the existing high water mark of the Atlantic Ocean.

"Inasmuch as such construction, of the character which is enjoined in the preceding paragraph, previously was permitted by the city only upon permit and thus was controlled by the city through the device of building permits, this injunction against the city's granting or continuing to grant such permits shall be construed to be an order that the city shall control such construction and not permit the same either by the granting of permits or without its permits.

"Power of the city to fix a harbor line in the Atlantic Ocean is recognized for purposes for which such a harbor line may be proper or useful, but no such harbor line lying east of the high water mark shall be any reason or basis for allowing or permitting riparian owners or other persons to build on or control the foreshore contrary to the injunction contained in this decree.

"An exception to this injunction shall be that it shall not extend or apply to construction of groynes or jetties built at right angles to the beach, in an east-west direction, the object and purpose of which are to preserve an existing beach, to trap the sand and to improve or enlarge the beach, but the authority to grant permits for the erection of such groynes shall not include authorizing or permitting erection of fences or walls across the foreshore or out into the ocean, the object or effect of which is to obstruct and prevent passage of the public along the foreshore portion of the beach."

After entry of the decree the defendant, the Miami Beach City Council voted not to appeal to the Supreme Court.

Since ocean front property is extremely valuable, the practical effect of the decision has been carefully considered.

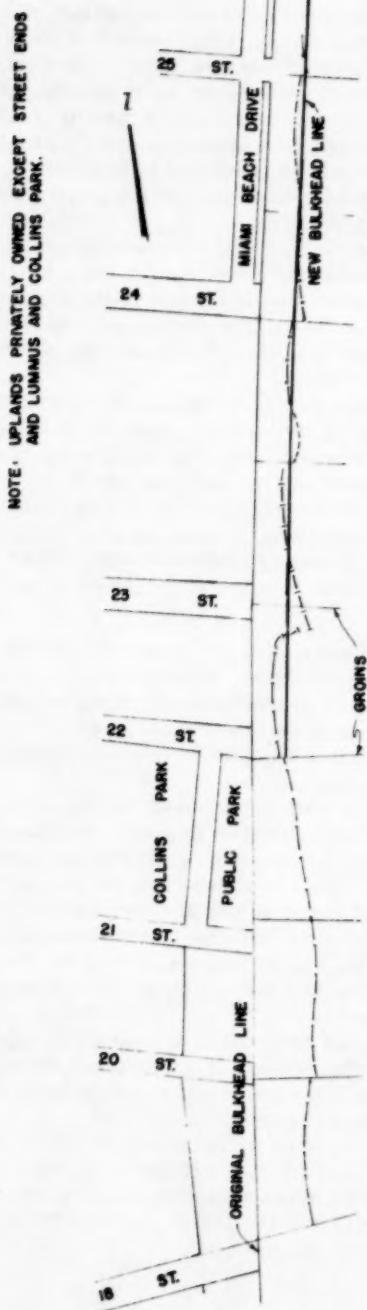
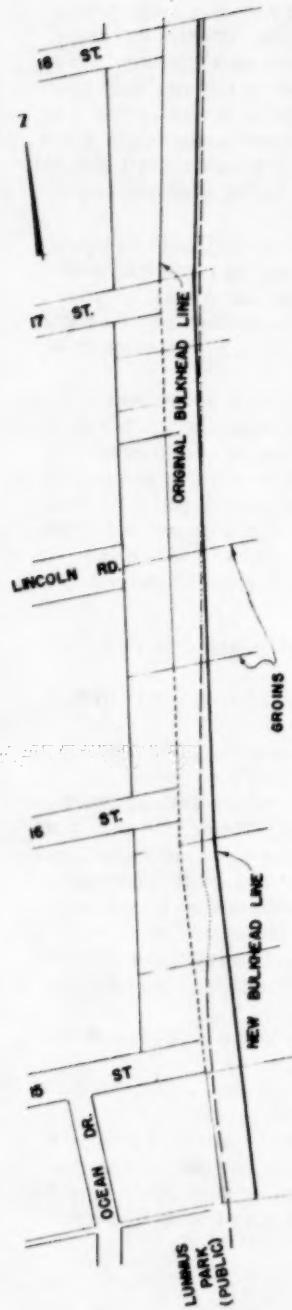
It does not prevent the City from controlling the location of bulkheads and outer limits of groins.

In effect it states that a bulkhead can not be constructed to the City of Miami Beach bulkhead harbor line until the Mean High Water line reaches that position. Since there is no prohibition against the construction of groins, it will require in many instances that the property owner first construct groins to protect his land, and then await the inevitable but incidental accretion before he proceeds with the construction of his bulkhead. In certain locations this will entail an increased cost to the property owner, but will pose no difficulty because of the extremely high value of the property and of the certainty of accretion.

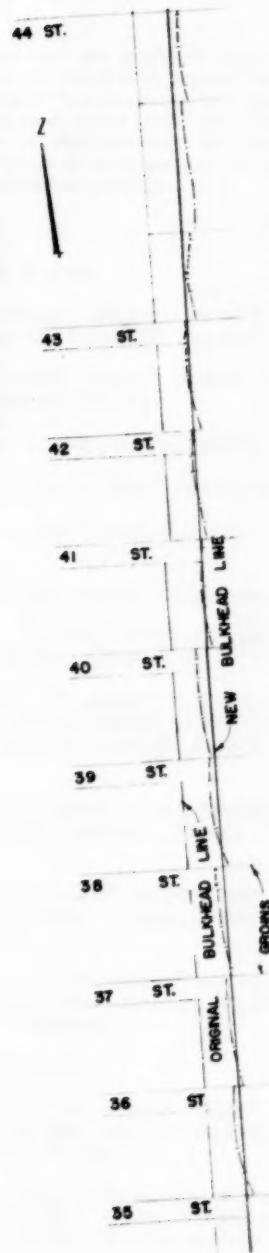
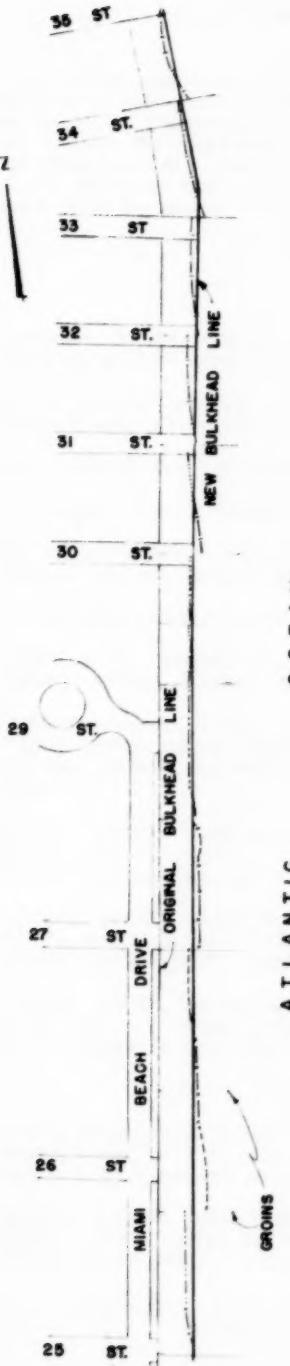
To date hearings have not been held with respect to the suit against the private owner, who was one of the original defendants.

It is probable that when a severe avulsion occurs in the future, hardship to property owners will result.

It should be expected in that event, however, that the affected property owners will seek modification of the ruling by contending that they have a right under those circumstances to reclaim land lost by such avulsions. Each owner individually will be able to pin-point his case with events of recent rather than remote origin.



SHEET NO. 1



LEGEND...

M.H.W. 1917 SPRING	M.H.W. 1926 JULY
M.H.W. 1927 FEB	M.H.W. 1928 JAN.
M.H.W. 1935 FEB.	M.H.W. 1939 FEB.
M.H.W. 1947 FEB.	

1977-1978

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The technical papers published in the past year are presented below. Technical-division sponsorship is indicated by an abbreviation at the end of each Separate Number, the symbols referring to: Air Transport (AT), City Planning (CP), Construction (CO), Engineering Mechanics (EM), Highway (HW), Hydraulics (HY), Irrigation and Drainage (IR), Power (PO), Sanitary Engineering (SA), Soil Mechanics and Foundations (SM), Structural (ST), Surveying and Mapping (SU), and Waterways (WW) divisions. For titles and order coupons, refer to the appropriate issue of "Civil Engineering" or write for a cumulative price list.

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FEBRUARY: 608(WW), 609(WW), 610(WW), 611(WW), 612(WW), 613(WW), 614(WW), 615(WW), 616(WW), 617(IR), 618(IR), 619(IR), 620(IR), 621(IR)^c, 622(IR), 623(IR), 624(HY)^c, 625(HY), 626(HY), 627(HY), 628(HY), 629(HY), 630(HY), 631(HY), 632(CO), 633(CO).

c. Discussion of several papers, grouped by Divisions.

d. Presented at the Atlanta (Ga.) Convention of the Society in February, 1954.

e. Presented at the Atlantic City (N.J.) Convention in June, 1954.

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